Ph.D. Synopsis

"GROUNDWATER STUDIES IN KANDHAR TALUKA, NANDED DISTRICT, MAHARASHTRA, INDIA: WITH SPECIAL REFERENCE OF GEOMORPHOLOGY AND STRUCTURAL CONTROL"

ABSTRACT

GROUNDWATER resource is a replenishable but finite resource. Rainfall is the principal source of recharge, though in some areas, canal seepage and return flow from irrigation also contribute significantly to the groundwater recharge. Groundwater resource comprises of two parts – dynamic resource in the zone of water-table fluctuation which reflects seasonal recharge and discharge of aquifers and static resource below this zone, which remains perennially saturated. INDIA is facing a serious problem of natural resource scarcity, especially that of water in view of population growth and economic development. Water being a prime natural resource, a basic human need and a precious national asset, its use needs appropriate planning, development and management.(N. K. Garg and Q. Hassan**,** 2007). Availability of groundwater is widely variable across the length and breadth of the country. Basalt lava flows of the Deccan Traps in Central India in Maharashtra, Madhya Pradesh and Gujarat have usually poor to moderate potential. Dug wells and dug-cum-borewells are the most common groundwater structures generally yielding between 1 and 20 lps. (*Rana* Chatterjee and Raja Ram Purohit,2009). Groundwater is an annually replenishable resource and its availability is non-uniform in space and time. A complexity of factors – hydrogeological, hydrological and climatological – control groundwater occurrence and movement. Kandhar Taluka is one of the acute water shortage areas in Marathwada, the drought prone region of Maharashtra. The water resources are controlled by Manar river tributary of Manjara, Geomorphology and Geology the area. The geologically it is part of Deccan Trap formations of Maharashtra. It is mainly hard rock terrain with restricted alluvium deposits. The present study is an attempt to study the ground water status in Kandhar Taluka of Nanded Dist. The Objectives of the present study are to find out the occurrence of groundwater; the identification, description and evaluation of structures and their impact of on ground water flow; the relationship between geomorphology, drainage pattern and groundwater occurrence. Detailed field studies will include the sampling of lithounits and pre-monsoon, post

monsoon periodical groundwater samples, water levels for groundwater studies and preparation geological map, lineament map, geomorphology map, morpho-metric analysis of landforms, drainage map and structural features. The groundwater quality and its utility with reference to drinking and irrigation purposes will be assessed based on hydrochemistry.

Keywords: Ground water Occurrence, Kandhar, Deccan Trap, Geomorphology, Strucuture Hydrochemistry, Geology,

INTRODUCTION

As Nanded district is part of Godavari river basin and the aquifers are confined to Alluviums, Deccan trap lava flows and Granitic rocks. The common rock types in the town are mostly Deccan trap basalts of late cretaceous to Eocene age. The Deccan Basalts comprise series of nearly horizontal basaltic lava flows. These flows consist of massive basalt, vesicular basalt, columnar and amygdaloidal basalts. They have very limited primary porosity. The water bearing capacity of vesicular basalts largely depends upon the size of vesicles; their density and degree of inter connections. The vesicular basalt is susceptible to weathering and has moderate water bearing capacity. The massive basalts are hard, compact and devoid of any primary porosity and permeability. However, the processes of weathering and presence of joints and fractures have developed secondary porosity and permeability. The occurrence of groundwater is controlled by the degree of weathering, jointing and fracturing. The groundwater occurs in weathered zones of amygdaloidal, basalts, vesicular basalts, columnar basalts and compact basalts (Kaplay, 2005).

The groundwater level in north of Godavari river area varies from 5.33 to 22.82 m. bgl and in south of Godavari river area varies from 2.33 to 10.37 m bgl. The bore wells have water potential of 250-18000 1ph. The annual drawdown is about 1.167 MCM with annual natural replenishment of 1.6083 MCM. But replenishment is not uniform throughout the town. Therefore groundwater level is more depleted in northern area as compared to southern area. (CGWB 2006)

GEOLOGY OF THE AREA

The Nanded district has four distinct stratigraphic units as peninsular gneisses; vindhyan limestone, Deccan trap basalts and recent alluviums. The formation in the study area mostly

comprises alluviums, series of nearly horizontal basaltic lava flows and granites (CGWB, 2006, Wesanekar, 1994)

The area lies between Manjra Tectonic zone to south and Pranhita - Godavari graben in the north both structures trending along NW-SE direction (Mishra, 2000). The NW-SE trending kadam fault lies to the north at distance of 90 km and Latur lineament about 100 km to the south (GSI, 2000).

Numbers of lineaments are passing through the study area and its vicinity (Sriwastav, 2007). These lineaments are trending in different directions as NW-SE, NE-SW, ENE-WSW and NNE-SSW directions. A major lineament (L1) of strike length of more than 72 km is passing through Nanded town in NW-SE direction. The lineament map with drainage network of the Nanded area (after MRSAC, Nagpur) also shows many lineaments in NW-SE & NE-SW directions, a minor lineament (L4) trending along NW-SE direction with a strike length of about 6 km is passing between Wadi (BK) and Jangamwadi. This lineament is aligned along the nala meeting Godavari river at distance of 2 km east of Hassapur. Based on the termination and swerving of the cross linears, faults are suspected along the lineaments L1, L2, L3, L7 and L8 (Shriwastav, 2007). The lineaments L1 and L3 are interestingly along the different courses of the Godavari river in eastern and central part of the area.

REVIEW OF LITERATURE

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OBJECTIVE OF RESEARCH

The present study is an attempt to study the ground water status in Kandhar Taluka of Nanded District. The Objectives of the present study are

1. To find out the occurrence of groundwater in the study area.
2. The identification, description and evaluation of structures and their impact of on ground water flow
3. The relationship between geomorphology, drainage pattern and groundwater occurrence.
4. The groundwater quality and its utility with reference to drinking and irrigation purposes

METHODOLOGY TO BE ADOPTED

Detailed field studies will include the sampling of lithounits ; pre-monsoon, post monsoon periodical groundwater samples, water levels for groundwater studies and preparation geological map, lineament map, geomorphology map, morpho-metric analysis of landforms, drainage map and structural features

Field survey and Sampling:

Detailed filed surveys will be conducted in different landforms and drainage basin of Manar in Kandhar Taluka. A large number of rock samples and groundwater samples will be collected along and across the representative sections, along the drainage, landforms and structures. Field Photographic record for important geological, geomorphological and structural features

Morpho-metric analysis:

The detailed morphometric analysis will be carried.

Analyses of samples:

The thin sections of representative rock samples will be prepared for petrographic study. Geochemical analysis of representative rock samples and groundwater samples will be carried out for quality of groundwater.

IMPORTANCE OF STUDY

International Status

Ground water is a gift of nature it about 210 billion m3 including recharge through infiltration. It makes up about twenty percent of world's freshwater supply, which is about 0.61 % of entire world's water. Including ocean and permanent ice global, groundwater storage is roughly equal to the total amount of freshwater stored in the snow and ice pact. Including the north and south poles this makes it important resources which can acts as a natural storage that can buffer against shortage of surface water, as in during times of drought.(Tirpude et al;2013) Water has been the most exploited natural resources in the world. In the world increase source of freshwater in all, there are 276 international basins, these cover around 46 % of the earth of the world host about 40 % of the world's population in 148 nations and accounts for approximately 6 % of the global river flow.(water cooperation 2013 is coordinated by UNESCO)

Throughout the world, regions that have sustainable groundwater balance are shrinking by the day. Three problems dominate groundwater use: *depletion* due to overdraft; waterlogging and *salinization* due mostly to inadequate drainage and insufficient conjunctive use; and *pollution* due to agricultural, industrial and other human activities. In regions of the world, especially with high population density, dynamic tube-well-irrigated agriculture and insufficient surface water, many consequences of groundwater overdevelopment are becoming increasingly evident. The most common symptom is secular decline in water tables.(Tushaar Shah et al; 2000).

Groundwater problems in West and South Asia are as pernicious as or even worse than those in China. A groundwater basket case is Yemen. A recent World-Bank memorandum on water management in Yemen noted: "the problem of groundwater mining represents a fundamental threat to the wellbeing of the Yemeni people. In the highland plains, for example, abstraction is estimated to exceed recharge by 400 percent" (Briscoe 1999).

National Status

Ground water is account for a large show countries agriculture output and farm incomes. But farming in both these regions is increasing becomes unsustainable owing to deplating groundwater levels. Ground water is becoming more difficult to across Sugercane palnatation growing in large amount in India is are not suited crop. Water is important role in the making to the electricity and agriculture

According to David Seckler, IWMI's Director General, a quarter of India's harvest may well be at risk from groundwater depletion. In South Asia,the urban groundwater scene is reaching a melting point: large cities like Ahmedabad and Jodhpur in Western India and Chennai in the South Indian state of Tamilnadu support thriving private groundwater businesses that draw water from tube wells in the neighboring hinterlands for supplies to high-income residential areas because groundwater tables in the cities are falling at a rate of 7–10 ft./yr. Besides depletion, waterlogging and the pollution of aquifers through human activity constitute another major groundwater challenge. Waterlogged areas in India are estimated at 6 million hectares ; in 12 major irrigation projects with a design command of 11 million hectares, 2 million hectares were 3 waterlogged, and another million hectares salinized (Mudrakartha 1999). An Irrigation Commission set up by the Government of India places canal irrigated areas suffering from waterlogging and salinization at 6 million in the early 1970s; these have increased substantially since then.

Now in present situation Mostly in India facing drought Situation In Southern and Eastern Maharashtra Northern Karnataka, Andhra Pradesh , Odisha, Gujarat and Telagana and Rajasthan Facing people to a drought (Wikipedia, the free encyclopaedia)

Significance of the Study

Kandhar Taluka is one of the acute water shortage areas in Marathwada, the drought prone region of Maharashtra. The water resources are controlled by Manar river tributary of Manjara, Geomorphology and Geology the area. The geologically it is part of Deccan Trap formations of Maharashtra. It is mainly hard rock terrain with restricted alluvium deposits. Some groundwater development work is carried out by Groundwater Survey Development Agency, (GSDA)and Central Groundwater Board (CGWB). The detailed work on groundwater occurrence is singularly lacking.

PROPOSED WORK PLAN

First Year:

Literature Survey

A review of published literature on Indian and global Ground Water will be carried out; the work carried out by Groundwater Survey Development Agency, (GSDA)and Central Groundwater Board (CGWB), Geological Survey of India (GSI) and other institutions specific to study area will also be collected.

Field work and sample collection

Detailed filed surveys will be conducted in and around Kandhar for the Ground water, Geomorphology and the Structural controls; rock and groundwater samples will be collected

Second Year:

Groundwater samples will be collected periodically. Water levels will be monitored Preparation of different types of Maps for geology, geomorphology, structural analysis and groundwater occurrence.

Third Year:

Groundwater samples will be collected periodically

Interpretation of Data: Field, Ground water , geomorphology and structures will be synthesized and interpreted employing of the aforesaid tools.

Writing and Submission of Thesis: The thesis will be written after the interpretation of data and achievement of objectives and will be submitted at the end of third year.

Presentation in Seminars International level and National Levels

Publication of research papers International Journals and National Journals

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